Postpartum haemorrhage

This is excessive bleeding following delivery and is described as primary and secondary.

Important information
Primary postpartum haemorrhage (PPH) is loss of blood estimated to be >500 ml, from the genital tract, within 24 hours of delivery (the most common obstetric haemorrhage) [1]: Minor PPH is estimated blood loss of up to 1000 mls. Major PPH is any estimated blood loss over 1000 mls. Secondary PPH is defined as abnormal bleeding from the genital tract, from 24 hours after delivery until six weeks postpartum.

Shah Jehan built the Taj Mahal in memory of his third wife, Mumtaz Mahal, who died giving birth to her fourteenth child, apparently of a PPH, in 1631.

Primary postpartum haemorrhage

Aetiology

The causes of PPH have been described as the "four T's" [2]:

- **T**one: uterine atony, distended bladder.
- **T**rauma: lacerations of the uterus, cervix or vagina.
- **T**issue: retained placenta or clots.
- **T**hrombin: pre-existing or acquired coagulopathy.

The most common cause of PPH is uterine atony, followed by retained placenta.

Epidemiology

Obstetric haemorrhage is no longer a major cause of maternal death in the UK. In the UK and Ireland there were 14 women who died from obstetric haemorrhage during or up to six weeks after the end of pregnancy in 2016-18 [3] .

Studies quote an incidence of PPH of around 5-10% [4] [5] . Incidence of severe PPH (blood loss >1000 ml or life-threatening) is quoted as around 0.3-1.86% depending on definition, and with regional variation.

Risk factors [1] [6]

- Antenatal risk factors:
    - Antepartum haemorrhage in this pregnancy.
    - Placenta praevia (12 x risk).
    - Suspected or proven placental abruption.
    - Multiple pregnancy (5 x risk). Also other causes of uterine over-distention such as polyhydramnios or macrosomia.
    - Pre-eclampsia or pregnancy-induced hypertension (4 x risk).
    - Grand multiparity (four or more pregnancies).
    - Previous PPH (3 x risk) or previous history of retained placenta.
    - Asian ethnic origin (2 x risk).
    - Maternal obesity. Body mass index >35 kg/m^2 (2 x risk).
    - Existing uterine abnormalities.
    - Maternal age (40 years or older).
    - Maternal anaemia. Hb <9 g/dL (2 x risk).

- Factors relating to delivery:
    - Emergency caesarean section (4 x risk).
    - Elective caesarean section (2 x risk) - especially if >3 repeat procedures [7] .
    - Retained placenta (5 x risk).
    - Mediolateral episiotomy (5 x risk).
    - Induction of labour (2 x risk).
    - Operative vaginal delivery (2 x risk).
    - Labour of >12 hours (2 x risk).
    - >4 kg baby (2 x risk).
    - Maternal pyrexia in labour (2 x risk).
- Pre-existing maternal haemorrhagic conditions:
    - Factor 8 deficiency - haemophilia A carrier.
    - Factor 9 deficiency - haemophilia B carrier.
    - Von Willebrand's disease.

Presentation

- Symptoms: continuous bleeding, which fails to stop after delivery of the placenta - third stage.
- Signs: loss of >1000 ml may be accompanied by clinically apparent shock, ie tachycardia, hypotension.

Associated diseases

Haemolysis, **E**levated **L**iver enzymes and **L**ow **P**latelets (HELLP). See the separate HELLP syndrome article for more information.

Management [1]

Ideally one of the emergency drills to be practised by the team on the labour ward.

A woman who will refuse blood products should have a management plan agreed early in the pregnancy, in case of haemorrhage.

Royal College of Obstetricians and Gynaecologists (RCOG) guidelines recommend **four components of management to be instigated at the same time**, once PPH has been identified. These are:

1. Communication
Alert all relevant professionals. In minor PPH, this is the midwife in charge, and first-line obstetric and anaesthetic staff. For major PPH, this also includes alerting the obstetric, anaesthetic and haematology consultants as well as the blood transfusion laboratory and porters.

2. Resuscitation
IV access with a 14-gauge cannula, and commence crystalloid infusion for minor PPH.

For major PPH:

- Assess airway, breathing, circulation.
- Oxygen by mask at 10-15 litres per minute.
- IV access with 2 x 14-gauge cannulae.
- Keep the woman lying flat and warm.
- Transfuse blood as soon as available. Until available, transfuse up to 2 litres of warmed crystalloid Hartmann's solution and/or 1-2 litres of colloid. Infusions should be warmed and a blood filter not used. In the absence of cross-matched blood, components may be required in line with local hospital guidelines and haematological advice.
- Recombinant factor VIIa (rFVIIa) is increasingly frequently used for arresting bleeding in severe haemorrhage [8] .

3. Monitoring and investigation
For minor PPH, FBC, blood group, coagulation screen. Monitor pulse and blood pressure every 15 minutes.

For major PPH:

- FBC, coagulation screen, baseline U&E, LFT.

- Crossmatch 4 units of blood minimum.
- Continuous monitoring of pulse, blood pressure, respiratory rate and urine output.
- Temperature monitoring every 15 minutes.
- Consider arterial line monitoring and ITU transfer.
- Records of all parameters on flow chart - for example, the modified obstetric early warning system (MEOWS) charts [9] .

4. Measures to arrest the bleeding

- Examination to establish cause, and exclude other causes than uterine atony (the most common cause).

- If the cause is established to be uterine atony, the following measures are taken in turn:

    - Bimanual uterine compression to stimulate contraction.
    - Ensure the bladder is empty.
    - Oxytocin 5 units by slow IV infusion. May require repeat. The latest Cochrane review supports the use of oxytocin as first-line treatment [10] .
    - Ergometrine 0.5 mg slow IV or IM unless there is a history of hypertension.
    - Oxytocin infusion unless fluid restriction is necessary.
    - Carboprost 0.25 mg IM repeated to a maximum of 8 doses unless there is a history of asthma. It is licensed only for bleeding after a caesarean section in Europe. It is also sometimes used off licence as an intramyometrial injection.
    - Misoprostol 1000 micrograms rectally. The Cochrane review determined misoprostol is not as effective as oxytocin, but may be helpful in low resource settings, as it does not need refrigeration or infusion.
    - Heat-stable carbetocin has been shown to be as effective as oxytocin for the prevention of blood loss of at least 500 ml or the use of additional uterotonic agents [11] .

- If these physical and pharmacological methods are not succeeding, surgical options as follows:

    - Balloon tamponade.
    - Haemostatic brace suturing - eg, the B-Lynch compression suture [12] .
    - Bilateral ligation of the uterine arteries.
    - Bilateral ligation of the internal iliac arteries.
    - Selective arterial embolisation.
    - Hysterectomy should be considered early, especially in cases of placenta accreta or uterine rupture. If possible, a second consultant should be involved in this decision.

Complications [10]

- Hypovolaemic shock.
- Disseminated intravascular coagulation.
- Acute kidney injury.
- Liver failure.
- Acute (adult) respiratory distress syndrome.
- Death.

Prognosis

Obstetric haemorrhage remains one of the major causes of maternal death in both developed and developing countries. The 2011-13 Confidential Enquiries into Maternal Deaths and Morbidity report identified 13 direct deaths due to obstetric haemorrhage in the UK and Ireland, with obstetric haemorrhage as the second leading cause of direct maternal deaths. [1] .

Prevention

The active management of the third stage of labour significantly reduces the risk of PPH. Prophylactic oxytocics should be routinely used in the third stage of labour, as they decrease the risk of PPH by 60%[1] [2] . For most women delivering vaginally, oxytocin 5 or 10 IU IM is the prophylactic agent of choice. It is used as an infusion for women having caesarean sections. Syntometrine® (oxytocin plus ergometrine) may also be used in the absence of hypertension. Although oxytocin is the management of choice, in low resource settings misoprostol is an alternative[13] [14] . Its advantages are that it can be given orally. One study found it was more effective when given sublingually[15] .

Women at risk of PPH should be identified, and the place of their delivery planned accordingly.

Secondary postpartum haemorrhage

This commonly presents in primary care as prolonged or excessive bleeding once the woman has returned home after delivery.

Aetiology

The two most common causes are:

- Infection - endometritis. This occurs in 1-3% after spontaneous vaginal delivery[16] . It is the most common cause of postnatal morbidity between day 2 and day 10. Risk factors are:
    - Caesarean section, prolonged rupture of membranes, severe meconium staining in liquor, long labour with multiple examinations, manual removal of placenta, mother's age at extremes of the reproductive span, low socio-economic status, maternal anaemia, prolonged surgery, internal fetal monitoring and general anaesthetic.
- Retained products of conception (RPOC).

Assessment

History

Symptoms vary but may include:

- Fever.

- Abdominal pain.
- Offensive smelling lochia.
- Abnormal vaginal bleeding - postpartum haemorrhage.
- Abnormal vaginal discharge.
- Dyspareunia.
- Dysuria.
- General malaise.

Look for history of extended labour, difficult third stage, ragged placenta, PPH.

Examination
There may be:

- Fever.
- Rigors.
- Tachycardia.
- Tenderness of the suprapubic area and adnexae.
- Elevated fundus which feels boggy in RPOC.

Investigation

- FBC.
- Blood cultures.
- Check MSU.
- High vaginal swab; also gonorrhoea/chlamydia.
- Ultrasound - may be used if RPOC are suspected, although there may be difficulty distinguishing between clot and products. RPOC are unlikely if a normal endometrial stripe is seen. Ultrasound is not helpful in endometritis [17] .

Management

- If sepsis is suspected in the community, urgent referral to hospital is indicated where 'red flag' signs and symptoms are present. If the woman appears seriously unwell, by emergency ambulance[18] :

    - Pyrexia >38°C.
    - Sustained tachycardia (more than 90 bpm).
    - Breathlessness (respiratory rate >20 breaths per minute - a serious symptom).
    - Abdominal or chest pain.
    - Diarrhoea and/or vomiting.
    - Uterine or renal angle pain and tenderness.
    - Woman is generally unwell or seems unduly anxious/distressed.

- Speculum examination will allow visualisation of the cervix and lower genital tract to exclude lacerations. If a clot is visible within the cervical os, it may be removed with tissue forceps (although few GPs regularly carry these), allowing the cervix to close.
- For endometritis: IV antibiotics if there are signs of severe sepsis. If less systemically unwell, oral treatment may be sufficient. Antibiotic choice should be guided by type and likely source of infection, as well as by local prescribing guidelines. The RCOG guideline for sepsis following pregnancy recommends IV piperacillin/tazobactim[18] . For severe sepsis, carbapenem plus clindamycin. Other options, for less severe infections include co-amoxiclav, metronidazole and gentamicin. However, it stresses guidelines based on local resistance should be followed
- If RPOC are suspected, elective curettage with antibiotic cover may be required. Surgical measures should be undertaken if there is excessive or continuing bleeding, irrespective of ultrasound findings. A senior obstetrician should be involved in decisions and performance of any evacuation of RCOP, as these women are carrying a high risk of uterine perforation.
- The patient may require iron supplementation if Hb has fallen. Warn of the risk of constipation.

Further reading

- A practical guideline for the haematological management of major haemorrhage; British Committee for Standards in Haematology (Jul 2015)

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